THE
ONTARIO WATER RESOURCES
COMMISSION

REPORT ON

PROGRESS IN POLLUTION
ABATEMENT

SEPTEMBER 1959

PARLIAMENT BUILDINGS - TORONTO

ONTARIO WATER RESOURCES COMMISSION
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- Contents -

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Water pollution concerns all persons. It is a problem in all countries, and is particularly significant in urban centres where population is large and industrial activities are extensive. Warm weather and low rainfall, as experienced in many places in the summer of 1959, tend to aggravate the situation, especially in those streams where seasonal fluctuations reduce the water flows in summer.

It would appear appropriate at this time to record what progress has been made in the Province of Ontario, in dealing with this situation since the Ontario Water Resources Commission came into being. The following information sets out the nature of the problem, what has been accomplished, and what remains yet to be done.

Formation of the OWRC

The Ontario Water Resources Commission was appointed following the 1956 session of the Ontario Legislature. An enlarged Act was put into effect in April 1957, with procedures established and authorization given to proceed with an extensive program for water and sewage works in the province.

Under this legislation, the Ontario Water Resources Commission was given two main assignments, one, to exercise control over water and sewage works throughout the province, and two, to assist municipalities in the construction of water and sewage projects. Thus, the Commission deals with

both water supply and sewage disposal. The latter includes industrial wastes. This report will deal only with the relationship between water pollution and domestic sewage or industrial waste.

The Nature of Pollution

It is well to have a clear understanding of what is involved in water pollution. Frequently there is confusion concerning the meaning of pollution, and what are its effects. In The Ontario Water Resources Commission Act, pollution is defined as any material which impairs the quality of the receiving water. This might be domestic sewage, industrial waste, silt, or any substance dangerous or otherwise to health, which makes the water less suitable for the many uses for which it is intended. Both visual observations and laboratory tests can be employed to determine the effects of any pollutant on a receiving watercourse. Three laboratory examinations are commonly employed for this purpose. One is the extent of bacterial pollution recorded by the coliform test. Another is the amount of the substances which tend to deprive the water of its oxygen content. This is commonly known as the B.O.D. or Biochemical Oxygen Demand test. The third is the amount of solids carried in the waste. Other conditions can be recorded, such as the colour of the water when a dye liquor is discharged into a stream, the odour of the water, if some substance creating an odour is present, as well as any other condition which tends to change the

natural quality of the water and impair its usefulness.

Domestic sewage carries a multitude of bacteria, and a substantial amount of B.O.D. and suspended solids. When sewage enters a stream it tends to remove oxygen from the water as the natural purification proceeds. If there is not sufficient water to dilute this waste the oxygen reduction can reach a point where the stream is said to be septic, and oxygen restoration is slower than its consumption. This stream, under these circumstances, will have an odour and be objectionable to the eye. Industrial wastes vary greatly. Some have a high B.O.D., others much suspended solids and some carry toxic material. The bacterial content of these may be low, or high as in cannery wastes, but the bacteria are not, generally speaking, of the dangerous kind found in domestic sewage.

When dealing with pollution control consideration must be given to the uses made of the water. The most important use is, of course domestic consumption. Thus, if a water intake is in the vicinity of the outfall it is necessary that the sewage be given thorough treatment and disinfection. Other uses of water to be considered include recreational facilities, industrial purposes, irrigation, etc. Water quality for drinking purposes must have the highest standard of all these uses. Accordingly, if water is satisfactory for domestic consumption it will generally be acceptable for other uses. This does not mean that water can be taken from a stream or lake and used for drinking without treatment. It

merely means that the water is of such quality that when given treatment, such as filtration and chlorination it will be quite safe and suitable for domestic use.

It is general practice to set the degree of treatment of the waste according to the use made of the stream. In doing so, it is recognized that streams must carry off the wastes from communities and from industry. There is no alternative to this. If a river is to be used for drinking purposes a short distance downstream a high degree of treatment of the wastes is necessary. If, on the other hand, no such use is made of the water, it is perfectly in order to lower the requirement of waste treatment to a point where no objectionable condition will be created in that stream, even though it might not be suitable for drinking after standard treatment. The enforcing agency in pollution abatement based on stream flow and uses is able to set these requirements for treatment and to ensure as a result of this, that the water will be of a satisfactory quality to meet all reasonable uses made of it.

OWRC and Pollution Abatement

The Water Resources Commission, since its inception has given a high priority to pollution abatement. It has been organized to deal with this problem, both in the field and in the laboratory. The field staff makes surveys of the streams, engineers examine industries and the wastes that they discharge, and the laboratory carries out the tests which enable a proper assessment of the situation. An

extensive program has been undertaken by the Commission to obtain accurate information on all sources of pollution, and to follow this with appropriate action for abatement. Much has been accomplished already, and the program is being continued as rapidly as facilities permit.

Progress in Pollution Abatement

Pollution abatement can be measured in a number of different ways. Some of these include the following:

1. The construction of sewage treatment plants and industrial waste treatment works.
2. Measurement by laboratory tests, of the extent of the pollution in the stream.
3. Investigations and information obtained through field surveys, along with supervision over waste treatment facilities.
4. Plans in progress or being developed for additional treatment works and for maintaining control in the future, which will ensure that the required objectives in stream sanitation are met.

An examination of this program of the Water Resources Commission will reveal what has been accomplished in the different directions, and what is expected in the future.

In dealing with any program for pollution abatement, it must be recognized that the necessary works require a substantial amount of time for completion. It is necessary to work out a number of difficult problems, including finances, engineering, consent of the rate-payers, construction

programs, as well as others. Where more than one municipality is involved it is often time consuming to have an agreement completed which will provide one sewage treatment plant for the entire area, rather than limiting this to separate municipal boundaries. The aim of the Commission has been to use joint treatment plants wherever these are economically desirable and feasible from an engineering standpoint. The preparation of engineering plans and specifications requires a substantial period of time, often as much as one year. The works to be built necessitate much planning and close checking of all details before bids for construction can be called. The construction program itself, often needs one to two years before the plant can be put into operation, and even longer on the major systems such as those involved in Metropolitan Toronto, Hamilton, Ottawa, and others. The Municipal Board must be satisfied that the expenditure incurred for these works is within the economic limits of the municipality. Thus it can be seen that even though the program proceeds without delay, a substantial amount of time is necessary to have it completed.

Status of Sewage Treatment in 1957

When the Commission's program on pollution control began in 1957 there was a back-log of needed sewage works. Some statistics at that time are of interest:

215 municipalities had sanitary sewers.

4,000,000 were served by these. This was 73% of the total population of the province.

269 municipal sewage treatment plants served 179 municipalities. 47 private sewage treatment plants were in use. 28 military sewage treatment plants were in use. 95 municipal sewage plants gave secondary treatment. 174 municipal sewage plants gave primary treatment. 83 municipal sewage treatment plants required modifications or changes then or some time later. 71 municipalities had either no sewage treatment plants or for only small areas.

These included: 14 cities
41 towns
16 villages and other areas.

121 municipalities had water works system but no sanitary sewer systems.

These were as follows: 30 towns
69 villages
22 others.

Progress in Sewage Treatment

In the interval since April 1957 progress on sewage treatment may be summarized as follows:

(1) Cities

Programs are under way in various stages in the following cities:

Name	Population	Remarks
Belleville	28,000	OWRC project
Brantford	51,000	OWRC project
Chatham	22,000	Engineering report completed

Name	Population	Remarks
Cornwall		OWRC project
Fort William (part)	42,000	OWRC project
Kingston	46,000	Completed
Niagara Falls	24,000	Engineering report near completion
Ottawa	235,000	Engineering design in preparation
Owen Sound	18,000	OWRC project
Port Arthur	38,000	OWRC project
Sarnia	47,000	Under construction
Sault Ste. Marie	54,000	OWRC project
Total population	605,000	

Cities not yet committed to definite program but action in progress

Name	Population	Remarks
St. Catharines (part)	41,000	Expected soon
Welland	18,000	Expected soon
Windsor	120,000	Expected soon
Total population	179,000	

Improvements to existing sewage treatment plants in cities.

Name	Population	Remarks
Guelph	34,000	Enlarged plant completed
Kitchener	63,000	OWRC enlargement
North Bay	30,000	OWRC - under construction
Stratford	20,000	OWRC - complete
Sudbury	55,000	OWRC - new plant to be built

Name	Population	Remarks
Toronto Metro	1,400,000	Major program
Waterloo	19,000	OWRC - under construction
Total population	1,621,000	

In summary on the cities of Ontario, it will be seen that:

(a) All cities with the exception of Welland and Windsor and part of St. Catharines are in the midst of programs for sewage treatment. The others are expected to act shortly. This will then provide sewage treatment for an additional population of 605,000.

(b) Improvements in treatment works are included in this program for 7 other cities with a total population of 1,621,000.

(2) Towns

Programs for sewage treatments are in various stages for 22 towns with a total population of 150,000.

In 10 other towns, the program for sewage treatment is progressing but final arrangements have not been made as yet. These have a total population of 60,000.

In 15 towns, these programs are yet to be conclusively undertaken. They involve a total population of 55,000.

Improvements or additions are included for 15 towns with a total population of 152,000.

Sewage Disposal in Towns

(a) Programs in various stages of progress.

Name	Population	Remarks
Amherstburg	4,504	
Arnprior	5,407	
Brockville	15,701	
Chesley	1,650	
Coniston	2,549	Completed
Copper Cliff	3,704	Completed
Dunnville	5,092	
Eastview	22,347	
Fort Frances	9,062	
Goderich	6,011	
Hanover	4,162	
Hawkesbury	8,359	
Huntsville	3,286	Under construction
Kenora	10,340	
Newmarket	7,629	
Niagara	2,713	
Paris	5,655	
Pembroke	15,476	
Petrolia	3,566	
Port Dover	2,848	
Tillsonburg	6,370	
Wiarton	1,953	
Total	148, 384	Under Construction

Sewage Disposal in Towns

(b) Some consideration being given.

Name	Population
Collingwood	8,302
Dryden	4,993
Matheson	859
Meaford	3,640
Merritton	5,842
Parry Sound	5,867
Renfrew	8,500
Thorold	8,272
Walkerton	3,717
Wallaceburg	7,997
Total	57,989

(c) Programs yet to be undertaken.

Name	Population
Campbellford	3,393
Cobalt	2,212
Gananoque	4,998
Iroquois Falls	1,566
Kincardine	2,669
Lively	3,117
Midland	8,348
Penetang	4,658
Perth	5,408
Port Dalhousie	3,383

(c) (Cont'd)

Name	Population
Powassan	978
Prescott	5,373
Smooth Rock Falls	1,145
Sturgeon Falls	6,213
Thornbury	1,112
Total	54,573

(d) Improvements or Additions

Name	Population	Remarks
Barrie	392	
Brampton	14,374	Another plant
Burlington	37,630	
Dundas	10,597	
Elmira	2,890	
Fergus	3,725	
Georgetown	8,200	
Grimsby	4,501	
Hespeler	4,109	
Orangeville	4,522	
Port Colborne	14,750	
Riverside	15,559	
Simcoe	8,279	
Trenton	12,105	
Whitby	10,543	
Total	152,176	

(3) Villages and Other Areas

Encouragement has been given to smaller communities to provide sewer systems and proper treatment facilities. New sewage treatment works have been built at Chippawa, Richmond Hill (now a town), Streetsville, London Township, Toronto Township, Trafalgar Township and Westminster Township as well as others.

(4) New Sewerage Systems

New sewerage systems are either completed, in progress or well advanced in: Bancroft, Frankford, Arthur, Bradford, Elora, Shelburne, Point Edward, Harriston, St. Jacobs, Sterling, Stouffville, Coniston, Mitchell, Nepean Township, Listowel, and Chinguacousy Township, and others.

Sewage treatment plants have been advanced markedly since formation of the OWRC. The total population to be served by the cities and towns listed in the preceding tables is more than 900,000. In addition to this the improvements to existing treatment plants involve a population of 1,621,000. The treatment of sewage in all sewered municipalities can be expected in a short while.

The Metropolitan Toronto Area

The Metropolitan Toronto Area with 13 municipalities involves special problems in sewage disposal. The magnitude of the program now under construction requires time for completion. Control of pollution cannot be looked for until these sewage works are in operation. This program for the City of Toronto was under consideration over 20 years ago.

When the trunk sewers and treatment plants are put into operation major sources of pollution will be under control.

Coincident with Metropolitan Toronto are the sewage treatment programs under way in the larger cities of Hamilton and Ottawa. Treatment facilities are now the order in both large and small communities.

Pollution from Private Outfalls

The Commission recognizes the importance of control over all sources of pollution rather than just the major outfall sewers. It is recognized that it is the responsibility of a municipality to exercise control over all connections to storm drains and outfalls to creeks and streams. Both the Council and the Board of Health should be concerned with this. The problem is more acute where sanitary sewers have not been built.

Surveys in municipalities made by the OWRC have shown that many private outfalls exist and that they carry a good deal of pollution. The Commission has been undertaking field studies to check on all such outfalls. This is then followed by action. The choice is either to install public sewage works or to have all private outfalls removed and treatment provided on each of the premises.

County Surveys

The OWRC has completed surveys in a number of countries. These deal with water resources and stream pollution. The counties of Essex, Lambton, Kent, Brant, Oxford, Middlesex, Norfolk, Elgin and Welland have been completed. The work in

others is proceeding. Special attention is given in this field work to the location of all private outfalls and other sources of pollution and including industrial wastes. This work is yielding valuable information upon which action is taken to bring about corrections.

The International Boundary Waters

The boundary waters between Ontario and the United States is considered by both countries to be a great natural resource. It can only continue to be so if it is kept free of objectionable pollution. For some time Ontario has been working with the International Joint Commission. The reference for this investigation includes the St. Mary's River, Lake Huron, St. Clair River, Lake St. Clair, Detroit River, and the Niagara River. Studies have proceeded since 1946, and considerable improvement has been obtained. Supervisory action is continued by the International Joint Commission with the Ontario Water Resources Commission as the enforcing agency in this province.

Industrial Wastes

The industrial wastes problem grows more difficult as this province becomes more industrialized. This is well illustrated by the surveys of the boundary waters. In 1913 industrial wastes were of such minor significance that they were scarcely mentioned in the report. In the second study in 1946-48 these wastes were the major features.

Industrial wastes are so variable in composition and

volume that they bear no direct relationship to sewage. Some industries produce more volume of waste than the sewage of the entire municipality in which they are located. Where the volume of waste is not too difficult to handle in public sewage works industry prefers to dispose of it in this way. Otherwise the obligation is upon the industry itself.

Close supervision is exercised over all industrial wastes. Much has been accomplished in this field but answers are still required in some kinds of waste. In general industry has been willing to co-operate in the protection of streams, and high expenditures have been incurred in building plants and operating them. Some of the major waste problems occur in the pulp and paper industry, canning, tanning, oil refining, chemical manufacture and the food industry. The OWRC has co-operated with these industries through laboratory facilities and conferences in finding the best methods of disposal. Quality standards have been set by the OWRC for these wastes.

Stream Surveys

The second means of measuring progress in pollution control is by stream surveys. These record the true value of the works constructed and the effects of the effluent on the receiving waters. While these sampling programs are time-consuming, they are valuable measuring sticks.

The OWRC is continually making stream surveys with sampling at specific locations. The flow in those streams should be related to the quantity of waste being discharged. All major water courses are under study by the Commission. When the sewage treatment plants are in full operation and other sources of pollution are under similar control, the samples will be expected to respond to the improvements.

Action to control pollution on a stream or lake as a unit has been used with success. On the Credit River the program for control of all wastes is nearing completion. On the Grand River sewage treatment works of adequate purifying potentials will soon be completed for all municipalities. Industrial wastes are being treated similarly. On the Thames River, steps are being taken with London and Chatham as the key centres. The Ottawa River is following the same method and Ottawa City is now preparing plans for new sewage works. Other municipalities on the river are advancing with their plans. The boundary waters from one end to the other will be protected by sewage and waste treatment works. Lakes are kept under supervision in the same manner. The Lakehead area is an example of surveys

and action by the OWRC to deal with all sources of pollution.

Joint Sewage Treatment Facilities

The policy of the OWRC has been to consider sewage treatment on an area basis rather than to restrict plants to their respective boundaries. This generally has an advantage in economy and in operation. Examples of this procedure are found in the three municipalities of the North Bay area, the three at Sault. Ste. Marie, and three in the Sudbury area, as well as in many other places. Under such circumstances, the Commission makes agreements with all municipalities for construction and operation.

Services to Municipalities and Industry

The OWRC offers services to municipalities and industry in the pollution abatement program. Financing of the remedial works is important at any time and especially so at present. The technical assistance offered by the Commission includes:

1. Laboratory facilities for examination of samples and for research. The new laboratory will be ready late in 1959.
2. The training and direction of sewage and waste treatment operators.
3. Industrial waste conferences and industrial waste investigations in municipalities.
4. Assistance of specialized technical personnel in these sanitary problems.

Industrial Waste Surveys

One branch of the OWRC devotes its activities to indus-

trial wastes and their processing. Studies of these are necessary whether they are to be discharged into public sewers or to other outlets. Where the former is the case they must be given sufficient primary treatment to prevent interference with the operation of the sewage treatment process. Extensive surveys have been undertaken by the Commission in many places. This work is continuing and it is hoped to be able to check on all industrial wastes of significance.

Summary

The work of the OWRC in abatement of pollution may be summarized under the following:

(1) Major construction programs for municipal sewage treatment plants are under way, some completed, some in construction, and others in the planning and design stages. The population to be served by these works exclusive of the big program in Metropolitan Toronto is over 811,373. Old sewage works are being revamped, enlarged or modified to make them capable of efficient operation. In spite of the lengthy period which must be required for such projects, the time is not far off for treatment of sewage from all municipalities.

(2) Equally important as the construction of the required works is the desire of municipalities to get on with these programs and to provide for clean streams.

(3) Field surveys of pollution on a county basis, and stream surveys on the river as a unit are yielding valuable information upon which remedial action is based.

(4) Investigation of industrial wastes and means of treating them has been carried on extensively in the Province.

(5) The policy of the Commission in withholding approval for sewer extensions until satisfactory plans have been under taken for sewage treatment is a recognition of the importance of action required now.

(6) The pollution abatement program in Ontario is proceed-

ing at a rapid pace and will continue aggressively until all streams are clean and available for all general use.